

## Excessive Dredging and Filling Threatens Many Levels of Florida Marine Life

Investigative Series: No. 1



Bulldozer spreads sediment on Dade County surf zone. Top marine scientists and anglers decry the consequential smothering of gamefish habitat and forage.

Some “beach re-nourishment” projects may really be acts of marine genocide.

Four hurricanes don’t hold a candle to the potential fish habitat disaster funded in the name of “shoreline protection.”

In the wake of last season’s storms, a panic-driven number of shoreline-armoring projects and so-called beach nourishment projects are proceeding throughout the state.

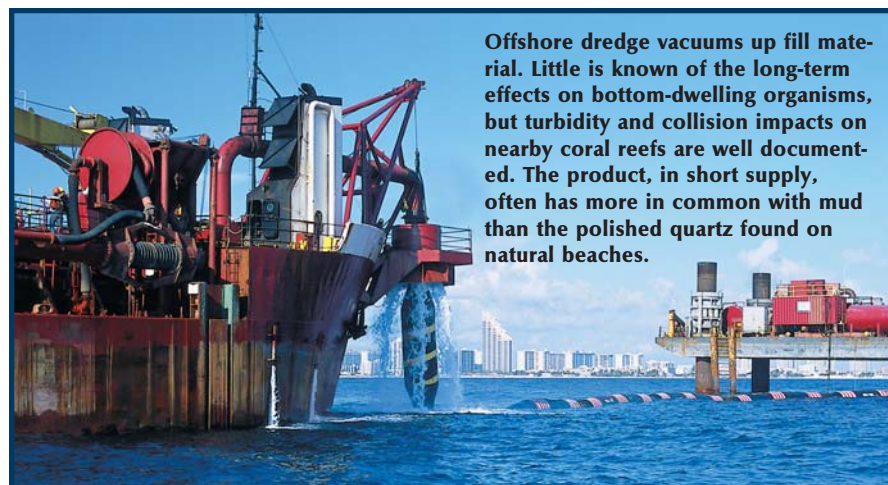
Bulldozers are burying famous pompano beaches of Martin County. The wonderful snorkeling reef at Phipps Park in Palm Beach County is doomed. Dredges are on the way to Sanibel and Captiva islands’ legendary snook beaches, among many others.

Meanwhile, marine scientists, environmental groups, veteran anglers, the dive community, the surfing community, and tax-dollar watchdogs such as Taxpayers for Common Sense say that much of the

coastal armoring and sand dredging needs to be curtailed, if a goal is to protect biological diversity and abundance as well as outdoor recreation along Florida’s coasts.

These voices, it seems, are being drowned out by special-interest lobbyists from the American Shore & Beach Preservation Association (ASBPA) and the Florida Shore & Beach Preservation Association (FSBPA). Largely comprised of

dredging contractors, coastal engineers and consultants who specialize in coastal construction, ASPBA/FSPBA has consistently maintained that beach nourishment causes only short-term turbidity with short-term environmental impacts. The majority of peer-reviewed scientific literature and anecdotes from anglers and divers contradicts this position. Due to the gravity of the threats, a three-part investigative report will run in the April, May



Offshore dredge vacuums up fill material. Little is known of the long-term effects on bottom-dwelling organisms, but turbidity and collision impacts on nearby coral reefs are well documented. The product, in short supply, often has more in common with mud than the polished quartz found on natural beaches.

and June issues of *Florida Sportsman*. We are examining the environmental legacy, the politics of and sustainable alternatives to seawalls and massive dredge-and-fill projects euphemistically termed by proponents as “beach nourishment projects.” Many experts say that in many cases there are better ways to save our beaches.

“Erosion isn’t a problem for beaches, just for buildings.” That famous and comprehensive statement came from Dr. Orrin Pilkey, renowned Duke University professor and author of *The Corps and the Shore*. Without condos stepping on the dunes, and without jetties to stop the natural longshore migration of sediments, Florida’s barrier islands would simply be reshaped rather than destroyed by storm events such as hurricanes and nor’easters.

But with buildings in place and sea level rising ineluctably, coastal engineers first responded with seawalls, jetties and groins, collectively termed “shoreline armoring.” Those hard structures only exacerbated erosion, so, by the 1970s, coastal engineers began promoting the “re-nourishment” concept as an environmentally friendly alternative to shoreline armoring. In the mid-’90s, the U.S.

Army Corps of Engineers released a 3-foot high, 15-pound document called the *Coast of Florida Erosion and Storm Effect Study*. Many thousands of pages thick, the study devotes one paragraph to the potential cumulative environmental impacts of the hundreds of shoreline-protection projects it proposes over the next 50 years. And, the paragraph concludes that only “cumulative benefits toward the natural coastline would be realized by all projects under the Coast of Florida Study.” This after vast segments of coral and nearshore reefs were destroyed by Dade County projects, and in other locations throughout the ’80s.

“Siltation and indirect burial from re-nourishment projects was largely to blame for the death of shallow coral reefs along Miami Beach,” acknowledged Steve Blair, who runs Miami-Dade’s beach nourishment program. “But, the technology has come a long way since then.”

Today’s full-scale beach restorations require the mining of up to two million cubic meters of offshore sediment, usually in 20 to 50 feet of water close to offshore reefs. The material is then pumped on the beach and in the surf zone. Advocates say mapping technology and innovations in fill placement can reduce reef impacts.

Critics counter with a litany of environmental woes attributed to dredge-and-fill projects waged with heavy equipment in extremely sensitive areas.

Contractors hired by the Corps use cutterhead or hopper dredges for excavation. Almost all seafloor-dwelling marine life occurs in that 6-inch margin of “topsoil,” and the dredge kills all manner of organisms—shrimp, crabs, mollusks, worms, seagrasses and more—across square kilometers of the continental shelf.

“The prevailing wisdom has been that the soft-bottom dwellers come right back,” said Phil Flood, Environmental Manager for the Department of Environmental Protection (DEP) Office of Beaches & Coastal Systems. Marine scientists and other observers (e.g. divers) doubt the validity of that assumption. For perspective, I conducted a thorough search, but failed to find any peer-reviewed studies of borrow-site impacts. That’s alarming.

The potential impacts to coral reefs and live bottom are better understood, and project applicants now must provide “reasonable assurance” that coral reefs and live bottom won’t be harmed and that nearshore hardbottom won’t get buried without mitigation. But depending on who you ask, “reasonable assurance” is



Juvenile snappers, grunts and other important species require exposed hardbottom habitat. This particular limestone outcrop (among acres of similar ones in Martin County) is now covered by the kind of fill material shown on the opposite page.





Healthy beach fisheries are vital to untold thousands of Floridians.

a gray area, and mitigation reefs rarely remain uncovered to achieve the specific ecological functions of nearshore hard-bottom.

After decades of reef degradation by dredging, DEP and other regulators now require buffer areas between the dredge sites and reefs, which are federally designated as Essential Fish Habitat and/or Habitat Areas of Particular Concern. But, there are no consistent standards, and as sand supplies shrink, regulators will likely face pressure to decrease buffer distances.

Indeed, it's already happening. A permit issued for four Broward County borrow sites requires the dredge operator to stay only 400 feet from 1,000-year-old coral reefs that contain almost half the coral species found in Caribbean waters. Marty Seeling, DEP Environmental Administrator of the Bureau of Beaches & Coastal Systems says, "The Corps balked at 400 feet, and insisted upon only a 200-foot buffer. But we wouldn't give in." Still, activists who discovered a staghorn coral colony overlooked by the Corps studies say the buffer isn't sufficient, and that the sediments will also migrate offshore and bury shallow coral reefs.

"The proposed massive dredge-and-fill project will add chronic silt, sediment and turbidity impacts to coral reefs and hard-bottom already stressed by algae and pollution," testified Dan Clark, Director of Cry of the Water, a Broward County coral reef monitoring group, before the Coral Reef Task Force.

Meanwhile, the value of nearshore reefs is becoming better understood. Near-



Sandfleas are getting scarce on repeatedly re-nourished beaches, say anglers. Research in North Carolina attributed localized elimination to the dumping of mismatched sediment.

shore hardbottom (a.k.a. worm reef or coquina reef) provides habitat to more than 530 marine organisms, including 320-plus animals. It's home for a variety of post-larval and juvenile snappers, grunts, groupers and wrasses (e.g. hogfish), plus a variety of reef cleaners. An early paper (1989) written by Walter Nelson entitled "Beach Renourishment and Hardbottom Habitats: A Case for Caution," wryly stated that, "Direct burial will be a terminal problem for many of the organisms that live on hard bottoms."

Moreover, wind, waves and tides carry these sediments well beyond the seaward and longshore boundaries of the fill site, burying or scouring additional reefs, snuffing photosynthesis in algae and corals and making it harder for juvenile drums, pompano and other gamefish to see prey in the surf zone. These re-suspension events can last from hours to decades. Dr. Hal Wanless, Chairman of Geological Sciences at the University of Miami's Rosenstiel School explains that it has to do with the nature of the sediments.

"Except for shallow shoals where sediments have recently been exposed to wave energy, there really aren't any offshore sediments suitable to place on the beach," Wanless said. "The sediments mined offshore either 'grew' there or migrated there because they're too fine to stay on the beach. Even when the grains are roughly the same size as the polished quartz beach sediments, they won't behave the same in the surf zone. They're hollow, angular shell fragments that have been bored into by algae and microorganisms. Once they're placed in a high-energy environment they break apart, release fine sediments into the surf zone, and migrate rapidly along with the silt component back offshore."

This explains why "re-nourished" beaches erode much more quickly than undisturbed beaches. It also explains the reef impacts, and, in terms of water quality, it explains why the surf zones of disturbed beaches in places such as Juno Beach, Jupiter Island, Fort Lauderdale and Longboat Key turn milky when the tradewinds blow. Most insidiously, it also

points to why experienced surf anglers avoid "re-nourished" beaches, and reinforces the findings of a peer-reviewed study in North Carolina that showed an 86 to 99 percent decrease in sandfleas (*Emerita talpoidea*) ten weeks post-nourishment. Subsequent monitoring showed hardly any long-term re-recruitment of this vital forage species on several repeatedly filled beaches in North Carolina, apparently "as a consequence of the poor match in sediment grade." In a survey of 45 South Florida anglers with more than 1,100 years combined fishing experience, the majority of anglers, including three bait & tackle shop owners who sell sandfleas, said that beach-fill projects had reduced or eliminated sandfleas along Southeast Florida beaches. There aren't any monitoring studies of beach-invertebrate impacts under way in Florida; meanwhile, emerging bonefish and permit research gives even more cause for concern for beach invertebrates.

"We now know that permit spawn year round, and that juveniles less than six inches long need windward beaches for habitat," explains Dr. Aaron Adams, a Mote Science Foundation researcher and author of *The Fisherman's Coast*. "New data also suggest that juvenile bonefish also prefer windward beaches."

These juveniles are too small to devour sandfleas, and scientists think they're feeding on micro-invertebrates such as amphipods. (A family of tiny, lobster-like crustaceans.)

"Flats guides in Biscayne Bay, for example, may have a real reason to be concerned about beach nourishment projects," Adams says.

In the May issue, learn why politicians are under so much pressure to fund projects that carry a documented number of negative impacts.

—Terry Gibson

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## Despite Damages, Florida Seems Addicted to Sand Pumping

*Investigative Series:  
2 of 3.*

This year, approximately \$117 million in federal tax dollars will be spent on “beach nourishment” in Florida, augmented by at least \$30 million from state coffers, plus funds from local entities. Some of that money will go to vital dune restoration projects, but most will go to dredge-and-fill projects ranging from 200,000 to 1.5 million cubic meters in volume.

Florida Statute, Title XI, Chapter 161, declares “beach nourishment” to be in the best interests of Florida citizens. More than \$886 million has been spent since the 1970s on beach-fill projects—more than in any other state. As covered in the April 2005 issue of *Florida Sportsman*, almost all peer-reviewed science and observations by anglers and divers point to serious ecological and recreational expenses. Advocates for the dredging and consulting industries justify the work with economic studies highlighting the need to maintain beach cosmetics for tourism revenue and property taxes.

Debbie Flack, Florida Shore and Beach Preservation Association’s (FSBPA) director of legislative affairs said, “Florida’s beaches create 706,000 jobs, and tax revenues from the properties they protect support our hospitals and schools.”

Flack is a former chief of the Florida Department of Environmental Protection’s (DEP) Office of Beaches and Coastal Systems. Flack’s primary lobbying tool is an economic assessment of Florida beaches conducted by Dr. William Strong, an economist at Florida Atlantic University. In 1997, she helped convince state legislators to create the comprehensive beach-funding plan. Subsequently, Flack told the *Gannett News Service*, “I tried to package this as an environmental program, but our selling point was economic development.”

Indeed, tourism and property taxes account for massive economic injections. Flack said the numbers exceed \$50 billion to date, without offering a specific time frame. And while Strong’s research is reviewed, it seems paradoxically comprehensive and generic. While the survey counts all beachgoers, the research



**Dad fishes while mom and kids play at Phipps Reef, in Palm Beach. A beach fill project here purports to restore recreation, but families come because of the reefs.**

does not take into account why individuals go to the beach, or to specific beaches. For example, it does not say how much divers spend to scuba dive healthy reefs in clean water in Southeast Florida, or how much anglers spend to catch pompano on Indian River County beaches, or how much surfers spend because of the waves that break over the nearshore reefs in Brevard County. (The latter group, you might be surprised to learn, contribute more than \$1 billion annually to Florida’s economy on the statewide level.)

The dredging lobby points to mitigation efforts. These, however, rarely entail or succeed in providing kind-for-kind habitat mitigation. Mitigation for nearshore reef burial usually entails an artificial reef placed in water too deep to provide the shallow structure required by juvenile snappers, grunts and groupers, among many other species that depend on unburied nearshore reefs.

“It’s not that we want these projects to impact anglers, but anglers represent a much smaller percentage than

tourism overall,” Flack said.

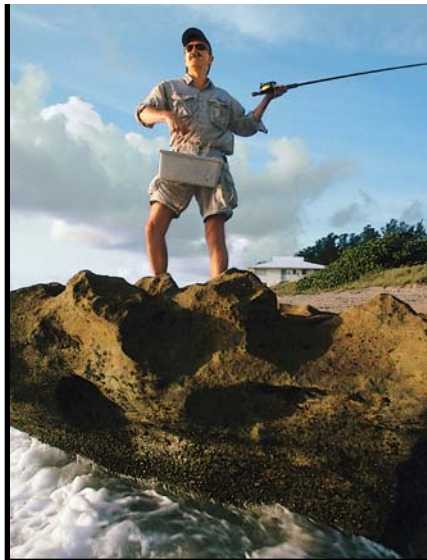
A Florida Fish and Wildlife Conservation Commission (FWC) study, *Economics of Fish and Wildlife Recreation*, attributes more than \$5.5 billion of the annual gross state product to saltwater fishing, and nearly 60,000 jobs. The sum is likely an underestimation because shorebound anglers don’t need a fishing license, and the Florida Marine Industries Association estimates that more than half of the reason for boating is fishing. The FWC estimate for dollars generated by boating is \$15.7 billion. In addition, agency officials admit—and dive shop owners in Dade, Broward, Palm Beach and Martin counties verify—that reefs that supported diving have been destroyed or obscured for long intervals by dredging projects since the 1970s.

Dr. Grant Gilmore, the scientist who first cataloged the fish in the Indian River Lagoon, and along the Treasure Coast’s many nearshore reefs, says these projects may be curbing angler success and enthusiasm no matter where you fish in salt water.

"The nearshore environment is so important to so many juvenile gamefish and forage species that individually and cumulatively these projects can impact fishing off the beach, in the lagoons and on the offshore reefs," he said. According to Gilmore and other top scientists, juvenile gag grouper, mangrove snapper, yellowtail, muttons, lane snapper, flounder, permit, pompano, grunts, assorted drums and all sea turtles—adult or juvenile—can be impacted due to habitat loss or diminishment of forage.

A search discovered 11 peer-reviewed scientific papers that documented serious impacts, and increasingly, agency-generated papers are recognizing more of the impacts anglers complain about. But Howard Marlowe, Director of Legislative Affairs for the American Shore and Beach Preservation Association (ASBPA), and who represents Martin County and other Florida municipalities, disagrees with independent scientists, anglers who have observed impacts, and divers who witness them.

Marlowe and the ASBPA aggressively attack anyone who questions the environmental impacts or economic equity of large-scale coastal dredging, such as the National Wildlife Federation and D.C.-based Taxpayers for Common Sense.



**Left, reefs provide natural buffers and awesome angling. Right, filled beaches are more erosion prone and leave escarpments difficult for anglers, never mind sea turtles, to climb.**



In a phone interview per request of *Florida Sportsman*, Marlowe stated categorically that, "Fish catches have never been interrupted for more than 30 days by beach re-nourishment. And there's evidence that shows the organisms living in the beach return quickly."

Fishermen and divers—witnesses to serious impacts from past projects—are appalled by ASBPA/FSBPA lobbying tactics.

"Their approach reminds me of tobacco industry lobbyists," said Jim Harter, president of the Stuart Fly Anglers club. "We demand an opportunity to rebuke him before the Martin County Commission."

Marlowe and Co., which specializes in this style of lobbying, represents at least 30 municipalities around the country. Martin County, Florida, alone pays him \$39,500 per year. According to FSBPA's 990 forms, Flack earns \$103,000 for lobbying for dredging funds, and according to other news sources, she also represents individual municipalities.

Because of the war in Iraq, Marlowe and Flack face increasingly tight-fisted legislators, who are debating funding allocations for Water Resources Development Act (WRDA) projects, which include beach nourishment projects. WRDA would also fund the Comprehensive Everglades Restoration Plan, but Everglades Restoration must compete with the beaches for attention six months after four hurricanes racked Florida, the most in over 100 years. But Flack and Marlowe are extremely close with some legislators, consulting companies and agency personnel that depend on dredging contracts.

For example, at a St. Lucie County meeting sponsored by state legislators, Flack was given a seat and a microphone alongside legislators and senior DEP officials.

"We're not only going to re-nourish eroded beaches, we're going to add to beaches that aren't eroded yet," she promised a large audience of mostly beachfront property owners. DEP personnel, as well as a number of county employees, nodded in agreement. We recognized Martin County Coastal Engineer Kathy FitzPatrick, whose boss, Don Donaldson, is Chair of FSBPA.

Critics say that the dredging lobby is governing our beaches, and that Harter's tobacco analogy is apropos—that beachfront interests are addicted to sand pumping. The addiction metaphor works in terms of what scientists, anglers and divers say, that "beach nourishment" is contributing to the steady decline of our coastal ecosystems.

And, it looks like we're running out of the drug.

"Most of the compatible sand, the cheap sand at least, is gone in the southeastern counties," said Phil Flood, an

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environmental manager with DEP's Beaches office.

That's a concern for some local governments because economic analyses and Army Corps permits show that "shoreline protection" is the primary benefit of the beaches. The tax bases generated by high-density, oceanfront properties keep property taxes down. And, nourished beaches have in places performed well as buffers, but the durations of their storm-shielding capabilities vary depending on the wave environment, age, design, sediment type, storm intensity and storm frequency.

"It appears to me that many of these projects disappear more rapidly than predicted for the re-nourishment cycle," said Dr. Robbin Trindell, FWC's senior sea turtle researcher.

Critics also say beach-fill projects merely give beachfront property owners a false sense of security about living in danger zones.

"It's psychological," said Steve Ellis, Vice President of Programs for Taxpayers for Common Sense. "When people see a big flood control project—which is what these things are—they feel they're safe. Beach nourishment encourages unsustainable growth and keeps people in harm's way. We've all seen it time and again where hurricanes kill people, destroy property,



**Pelicans ambush mullet on reefs at Phipps Park. Turtle experts confirm there's no reason to expand the beach, and the reefs provide essential food and cover for juveniles.**

someone rebuilds, and it happens again."

It's not clear if people working in the lucrative beach-building industry are counted among the 706,000 jobs. ASBPA/FSBPA is largely comprised of the dredgers, engineers, agency personnel and sundry consultants who make a living off these high-dollar projects. A handful of dredging, engineering and environmental consulting groups score these lucrative contracts, and the projects encourage growth in agencies such as the Army Corps of Engineers, which relative to size enjoys one of the biggest budgets in government.

Many of these consultants and bureaucrats sit on conservation boards. They say the close relationships and partnerships facilitate the permitting process and help ensure better projects. Conservationists, anglers and divers say the dredging industry has become government.

"Agencies are working at cross pupos-

es and individuals from the Corps, DEP and the consultants have clear conflicts of interests," said Dan Clarke, Director of Cry of the Water, a Broward-based coral monitoring and diving group.

Although the excessive dredging and pumping increasingly incense sportsmen, beachfront property owners demand the projects and some downplay the environmental impacts.

"We've been writing letters demanding re-nourishment of the mid-reach section [Brevard County] long before the hurricanes," said Cliff Dickinson, founder of Salvage Our Shoreline (SOS), a non-profit organization dedicated exclusively to getting a dredge-and-fill project on a nearshore reef system, declared Essential Fish Habitat/Habitat Area of Particular Concern, one with a 15-year history of protection.

"There ain't a fish in the ocean that can't live in a little deeper water," he said. Peer-reviewed studies that refute him include one entitled *Nearshore Hardbottom Fishes of Southeast Florida and Effects of Habitat Burial Caused By Dredging*. It states, in the contexts of snappers and grunts on the windward side of barrier islands in East Florida, "There are no other natural habitats in the same nearshore areas that can support equivalent abundances of early life stages."

His team mobilized some condo owners for a county commission meeting, where Commissioner Jackie Colon said she would "crush" anyone who opposed the project.

According to the SOS website, a campaign objective is to, "Identify and publicize the contact information of any potential roadblocks." A California-based surfing group called *Save the Waves* went to bat for disenfranchised local surfers, anglers and divers and filed an official letter of complaint about Colon's language and Salvage Our Shoreline's tactics. Next month, we explore why more sustainable coastal management tools aren't being used.

—Terry Gibson

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## Poor Results Prove Need for Overhaul of Beach-Fill Policy

As this summer approached, bulldozers belled smoke, dredges chipped away at the continental shelf, and millions of cubic yards of sediments were deposited on Florida beaches. The Florida Dept. of Environmental Protection (DEP) had permitted 34 dredge-and-fill projects for beaches around the state. Among these, a rapid shoring up of beaches in St. Lucie County, affected by

sediments and crushed rock. The sediments were steamrolled into a hard-packed berm onto the beach face. St. Lucie beaches have ranked second in turtle nest numbers in the state and boasted vast, healthy nearshore reefs. The beaches are famous for pompano fishing.

Dr. Hal Wanless, Chair of Geological Sciences at the University of Miami, drove up to inspect the damage.

For weeks, water color and consistency resembled diarrhea along Hutchinson Island.

"But it met DEP standards," insisted Richard Bouchard, St. Lucie County's coastal engineer. Bouchard is a director on the board of the Florida Shore & Beach Preservation Association, the organization that lobbies state and local legislators for coastal dredging and related "shore-protection" projects. Martin County engineer (and Chair of FSBPA) Don Donaldson hadn't visited the St. Lucie site, even though only an arbitrary county line divides Hutchinson Island and Martin County's tremendous fish habitats, directly downstream.

DEP is analyzing the sediments, and Dr. Wanless doubts they meet DEP standards, which Debbie Flack (FSBPA's lobbyist) helped write, and which Wanless says aren't strict enough. He also analyzed the sediments recently placed over four miles of Martin County beaches, in the proximity of some of the state's most biologically diverse nearshore reefs.

"Contrary to what the people who are promoting this practice are saying," said Wanless, "both the St. Lucie and Martin County projects will erode rapidly, and turbidity is going to be a serious problem for a long while. The finer sediments will smother reefs."

At the southern end of Florida's Atlantic coast, yet another debacle ensued.

In April, Army Corps of Engineers Project Manager Penny Cutt, and John Studt, Chief of the Corps' regulatory branch, kick-started an 11-mile project in Broward County. Permits required contractors to transplant 2,000 doomed corals, required extensive pre-construction monitoring of these transplanted organisms' health, and required the distribution of education modules for dredge operators on techniques for reef protection. As of May 1, only a few hundred corals had been transplanted—none successfully. The monitoring hadn't been completed, and the Corps passed out education modules only after the Environmental Protection Agency (EPA) and National Marine Fisheries Service (NMFS) sent stern letters.

"The contractor destroyed existing nearshore hardbottom with giant boulders they brought in to imitate low-relief reefs," said Dan Clarke, director of Cry of the Water, an independent monitoring group.

"They're just big, algae-covered, slimy boulders," said Dr. Ray McAllister, Professor Emeritus of Ocean Engineering at Florida Atlantic University, and author of the popular dive guide, *McAllister's Guide to Reefs*. "A few of the transplanted corals

### Investigative Series: Number 3



**"A permanent time release of mud," is how a visiting geologist described the goo dumped onto St. Lucie County beaches in April. The claylike stuff came from a site miles inland.**

last fall's Atlantic hurricanes.

In April, Coastal Planning & Engineering had sediments trucked in from an inland mine at the corner of Indrio Road and I-95 for a shoreline restoration project in St. Lucie County. Typically, the mine produces roadbed material, mostly clay, fine

Wanless said, "The sediment they put down here is unsuitable. There are clods of clay and such a high proportion of fine material. It has nothing to do with the beach sand on any of Florida's beaches. This is going to be a permanent time release of mud into the system."



are alive, but they have white plague. In short, the mitigation is a dismal failure.”

“We’re hoping to resolve this locally,” said Miles Croom, from NMFS Habitat Conservation Division. NMFS recently proposed elkhorn and staghorn corals for listing as threatened species under the Endangered Species Act. Acres of staghorn are threatened by the Broward project.

In certain areas, appropriate beach-fill projects may be necessary to maintain turtle and shorebird nesting habitats. But Wanless and other leading geologists say that if maintaining biological diversity in coastal Florida is a goal, more rigorous testing for sediment compatibility and durability is a must.

“For lots of reasons what’s good for turtles is good for Floridians,” said David Godfrey, executive director of the Caribbean Conservation Corporation, our nation’s oldest sea turtle conservation group. “Like people, turtles need clean healthy beaches, sandy dry areas, clean water and healthy reefs.”

Howard Marlowe, a Congressional lobbyist, often touts massive beach-fill projects as turtle-habitat restorations.

But, experts say that a one-size-fits-all, big-square-template actually harms turtles. According to Duke University geologist Dr.

Orrin Pilkey, filled beaches erode two to twelve times faster than native beaches, and leave high dropoffs, called escarpments, that turtles can’t climb. The long beaches can cause “false crawls,” and if compacted, sediments can make it difficult for adults to dig nests and juveniles to climb out. Plus, the dark material elevates nest temperatures—turtle sex is determined by nest temperature.

One avenue to reform involves defining a healthy beach by its natural attributes rather than by width. And that would entail DEP moving toward a system of beach-by-beach erosion analysis, and custom beach-fill templates.

“Look at the Archie Carr Refuge, look at Tortuguero, Costa Rica. The most productive turtle-nesting beaches in the world are narrow, high-energy beaches,” said Godfrey.

Other erosion-control engineering solutions have been implemented with varying success around the world. Sand transfer plants, such as those at Palm Beach Inlet, restore the natural littoral flow of sediments where jetties have interrupted the process. The world’s most sophisticated sand transfer system, in Tweed River, Australia, annually deposits 600,000 cubic meters of high-quality sand—nearly half the



**At left is natural sand from a beach north of Fort Pierce Inlet; at right is offshore borrow material that was pumped onto Martin County beaches. Given a shake, the natural sand settled out in seconds, while the borrow material fouled the water indefinitely.**

volume of one of Florida’s larger dredge-and-fill projects—on the downstream side of the inlet. But, so far, South Florida has only one major fixed transfer plant and it can’t keep up with sediment migrating into the inlets, and its maintenance has been erratic. So, periodic inlet maintenance



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dredging is required. Generally, the sand in the inlets is of high quality, and can be used to re-nourish the erosion hotspots that invariably occur on the south side of jetties on Florida's Atlantic coast.

Offshore breakwaters that absorb wave energy have also been used to stabilize beaches. Dr. Kerry Black, an oceanographer from New Zealand, seems to have successfully stabilized a beach on Australia's high-energy Gold Coast, and in the process created excellent marine habitat. But not all coastal experts are sanguine about breakwaters.

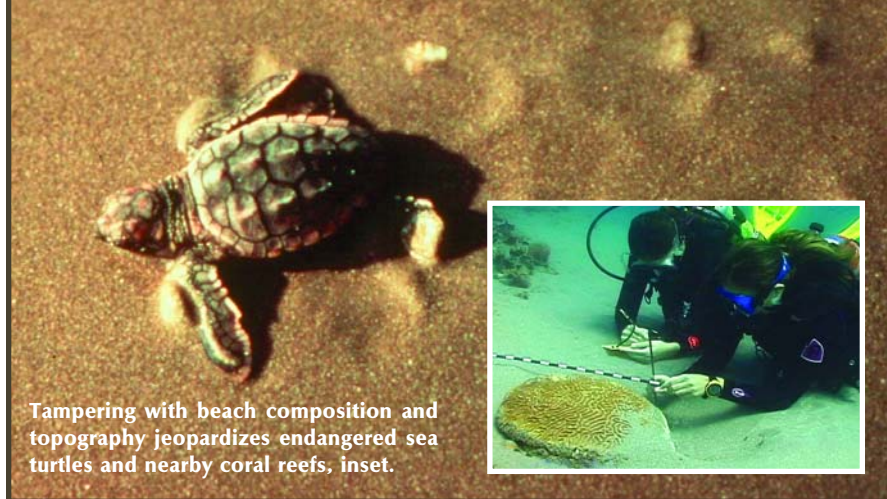
"If you place a hard structure in the surf zone it will likely cause some erosion nearby," said Pilkey.

"We're still looking for the silver bullet," said DEP's Phil Flood.

It seems that sound sustainable development policies and a retreat strategy are the only medium- to long-term ways to have healthy beaches and navigable inlets.

"In places where the shoreline is critically eroding, beachfront property is sort of like the new swampland in Florida. We don't really know how long it's going to be there, and you're taking a great risk by buying, building or living in these hazardous areas," said Godfrey.

California and North Carolina have



Tampering with beach composition and topography jeopardizes endangered sea turtles and nearby coral reefs, inset.

both set managed retreat precedents, but Florida has yet to address this issue (see managed retreat case studies at [www.kqed.org/coastalclash](http://www.kqed.org/coastalclash).)

"We need to explore incentive-driven ways to move back in some areas, in ways that aren't confrontational, through programs such as tax advantages and conservation easements," Godfrey said.

Many interest groups spent 30 years convincing the Corps that shoreline armoring isn't sustainable, and even the American Shore and Beach Preservation Association (ASBPA) may support some alternatives to seawalls and massive dredge-and-fill projects. Marlowe, for example, is excited about an artificial reef/breakwater pilot program in California. And, outdoorsmen working under the ASBPA aegis suggest a different tack.

"Shorelines are dynamic, and the concept of allowing the shoreline to retreat conflicts markedly with 'static' perspectives and perhaps also the short-term nature of politics and lobbying considerations," said Bob Battalio, a waterman, coastal engineer and California Shore & Beach Preservation Association board member. "I think this is the 'undercurrent' that's pulling us down and it needs to be addressed."

But in response to the second report, Howard Marlowe sent *Florida Sportsman* the following email.

"Perhaps you will find this 'appalling.' I, however, find your poor excuse for journalism to be appalling," he wrote.

As noted in the second report, Marlowe aggressively attacks anyone who questions the environmental impacts or the social/economic equity of large-scale coastal dredging. We suggest the really appalling claims reside within Marlowe's uniquely arrogant and ignorant press releases, for example the absurd attacks on independent biologists in a March 2004 press release (go to [www.floridasportsman.com](http://www.floridasportsman.com)).

Influential lobbyists may try to drown the voices of recreational users, independent scientists, and taxpayers far from beachfront properties. But the author and editors associated with this investigative series are comfortable in asking rigorous and overdue questions about the excessive reliance on massive dredge-and-fill projects for erosion control, serious conflicts of interest that result from the dredge lobby and associated consultants governing our beaches, the continued denial of any possible impacts to reefs and fisheries, and regulatory impotence stemming from the Army Corps of Engineers' uniquely powerful tripartite position as advocate, funder, and permitting body for massive dredging projects.

*Florida Sportsman* will keep a badly needed spotlight on Florida coastal management, and we encourage readers to come to us with their concerns.

—Terry Gibson

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